UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/788,453	03/01/2004	Naoko Ikegaya	566.43577X00	7377

24956 7590 11/21/2006

MATTINGLY, STANGER, MALUR & BRUNDIDGE, P.C.
1800 DIAGONAL ROAD
SUITE 370
ALEXANDRIA, VA 22314

EXAMINER	
MCFADDEN, MICHAEL B	

ART UNIT	PAPER NUMBER
2188	

DATE MAILED: 11/21/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/788,453	IKEGAYA ET AL.	
	Examiner	Art Unit	
	Michael B. McFadden	2188	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 October 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *13-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *13-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *01 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of Claims

1. Claims 13-31 are pending in the Application.

Response to Amendment

2. Applicant's arguments filed on 11 September 2006 have been fully considered but they are not persuasive.

Information Disclosure Statement

3. As required by M.P.E.P. ' 609 (C), the applicant's submission of the Information Disclosure Statement dated 26 May 2006 is acknowledged by the examiner and the cited references have been considered in the examination of the claims now pending. As required by M.P.E.P. ' 609 C(2), a copy of the PTOL-1449 initialed and dated by the examiner is attached to the instant office action.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 13, 25, 26, 27, 28, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over LeCrone (U.S. Patent No. 6,529,944) and further in view of Henry et al. ((US Patent No. 6,681,392) herein after Henry) and Rai et al. ((US Patent No. 6,438,110) herein after Rai).

Regarding Claim 13 LeCrone discloses a computer system, which includes a plurality of storage subsystems being sequentially concatenated to a host computer, and which performs remote copy between said storage subsystems **(See Figure 1, Elements 2, SYMM2, SYMM5, and SYMM6 also See Column 1, Lines 26-30)**,

A first storage subsystem comprising:

An interface which receives a status information acquisition command and which sends status information from the first storage subsystem to a second storage subsystem that is located on a nearer side of the first storage subsystem relative to the host computer and connected to the first storage subsystem;

An outgoing status information storage unit which stores said status information to be sent to said second storage subsystem;

A target storage subsystem judgment unit which judges whether a target storage subsystem identified in the status information acquisition command received by said interface is the first storage subsystem.

A command downstream sending unit which sends said status information acquisition command to said third storage subsystem and connected to the first storage subsystem, when said target storage subsystem judgment unit judges that

the first storage subsystem is not said target storage subsystem from which said status information is to be acquired;

A self status information acquisition unit which acquires the status information of the first storage subsystem and which stores the acquired status information to be sent to the second storage subsystem into said outgoing status information storage unit, when said target storage subsystem judgment unit judges that the first storage subsystem is said target storage subsystem from which said status information is to be acquired, and

A downstream status information acquisition unit which receives the status information from said third storage subsystem and which stores the received status information to be sent to the second storage into said outgoing status information storage unit,

Wherein, after said self status information acquisition unit or said downstream status information acquisition unit stores said status information into said outgoing status information storage unit, said interface sends said stored status information.

Regarding the claim see Column 8, Lines 40-47. This teaches that the host (Fig.1, element 2) has the capability to determine the status of any device anywhere in the stream. Also it states that the commands can be sent downstream to take effect one or two or more SRDF locations away. In order for this to occur each unit must contain an interface, which receives the status acquisition command and sends it back upstream to the unit next in

line. There also must be an outgoing status information storage unit, which stores the status information that will be sent.

A target storage subsystem judgment unit must also be present because the host is able to select which system's status is being acquired. (See Column 9, Lines 9-12) In order to identify itself using that query the judgment unit must be present.

A command downstream sending must also be present in order to send the commands from the host downstream.

A self status information acquisition unit must be present if the systems (Fig.1, Element SYMM2, SYMM5, SYMM6) are able to inform the host of their status information. A downstream status information sending unit must also be present in order to receive the information being sent from downstream systems.

The information clearly is sent along the chain and reporting back to the host the requested status information.

LeCrone fails to disclose wherein the status information includes a copy progress rate, which indicates a concordance rate of data between a first logical volume and a second logical volume of said first storage subsystem or at least one third storage subsystem that is located on a farther side of the first storage subsystem relative to the host computer.

Henry discloses wherein the status information includes a copy progress rate, which indicates a concordance rate of data between a first logical volume and a second

logical volume of said first storage subsystem or at least one third storage subsystem that is located on a farther side of the first storage subsystem relative to the host computer. **(Henry: Column 2, Lines 61-63)**

LeCrone and Henry are analogous art because they are from the same field on endeavor, remote copy networks.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to transfer the copy progress of Henry as part of the query request of LeCrone.

The motivation for doing so would have been to help a network administrator pinpoint where slowdowns and potential hangups exist in a network. By analyzing copy progress rates and adjusting accordingly as a preventative measure, a system can be made more efficient and will be more prepared to handle extra bandwidth constraints in times of heavy usage.

Therefore at the time of the invention it would have been obvious to transfer the copy progress of Henry as part of the query request of LeCrone for the benefit of helping a network administrator pinpoint where slowdowns and potential hangups exist in a network and by analyzing copy progress rates and adjusting accordingly as a preventative measure the system can be made more efficient and will be more prepared to handle extra bandwidth constraints in times of heavy usage to obtain the invention as specified in Claim 13.

LeCrone and Henry fail to disclose wherein the said copy progress rate is being used to determine, by said host computer, which of at least one of plurality of status information acquisition command routes is displayed on said host computer, said status

information acquisition command routes being routes on which a status information acquisition command is relayed via one or more of said plurality of storage subsystems,

Rai discloses wherein the said copy progress rate is being used to determine, by said host computer, which of at least one of plurality of status information acquisition command routes is displayed on said host computer, said status information acquisition command routes being routes on which a status information acquisition command is relayed via one or more of said plurality of storage subsystems, **(Rai: Figures 17 and 18. Column 16, Lines 14-17 along with Figure 13 and Column 15, Lines 18-30) Rai discloses the ability to schedule the connections based on varying factors. One of them being copy progress rate. When selecting copy progress rate as a scheduling factor it will then cause the connection to be displayed by the scheduler. Therefore the copy progress rate has been used to determine which routes are displayed.)**

LeCrone, Henry, and Rai are analogous art because they are from the same field of endeavor, network computer systems.

At the time of the invention it would have been obvious to one of ordinary skill in the art to display the network links' bitrate capacity and usage of Rai in the system of LeCrone and Henry.

The motivation for doing so would have been to provide the operator with useful information for managing the connections over various links in such a way as to average out the overall traffic loading on the network due to the scheduled connections,

avoiding any periods where particular links become overloaded, and balancing out the requested connection over a plurality of different links and spread out over time.

Therefore it would have been obvious to display the network links' bitrate capacity and usage of Rai in the system of LeCrone and Henry for the benefit of providing the operator with useful information for managing the connections over various links in such a way as to average out the overall traffic loading on the network due to the scheduled connections, avoiding any periods where particular links become overloaded, and balancing out the requested connection over a plurality of different links and spread out over time to obtain the invention as described in claim 13.

6. **Claims 25, 26, 27, and 28 are rejected using the same rationale as Claim 13. The Office would like to note that in claims 27 and 28 the status information is regarded as the "data transfer rate of copying data", which is the same as the copy progress rate of claim 13.**

7. **Regarding Claim 31,** LeCrone and Henry disclose a storage system, comprising: a first storage device coupled to an information processing device and having a first controller and a plurality of first disk drives, at least one of said first disk drives being related to a first logical volume; said first controller receiving data, which are sent from said information processing device interface and targeted to said first logical volume, and storing said data received from said information processing device into said at least one of said first disk drives', a second storage device coupled to said first storage device and having a second controller and a plurality of second disk drives, at least one of said second disk drives being related to a second logical volume', and

said second controller receiving data targeted to said second logical volume and storing said data targeted to said second logical volume into said at least one of said second disk drives', wherein said first controller receives a first command from said information processing device and transfers said first command to said second storage device, said first command being used to request a copy status of between said second logical volume of said second storage device and said third logical volume of said third storage device, wherein said second controller receives said command from said first storage device and replies said copy status based on said command, wherein said first controller receives a second command from said information processing device and transfers said second command to said second storage device, said second command being used to request a configuration information, which indicates a configuration of one or more resources of said second device, or a log information of said second storage device, and wherein said second controller receives said second command from said first storage device and replies said configuration information or said log information based on said second command. **Claim 31 is rejected using the same rationale as Claim 13. Further, regarding the configuration information request, the host computer is able to send requests for identification information and is also able to perform split, copy, and restore commands on remote locations. (LeCrone: Column 4, Lines 7-21) With the ability to perform those actions the host must be able to identify the type of system, along with the configuration, that it is dealing with. Therefore a configuration information request is inherent.**

8. Claims 14, 15, 16, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over LeCrone (U.S. Patent No. 6,529,944), Rai et al. ((US Patent No. 6,438,110) herein after Rai), and Henry et al. ((US Patent No. 6,681,392) herein after Henry) as applied to Claim 13 and further in view of Reichbauer et al. (herein Reichbauer (U.S. Patent No. 4,881,074)).

9. **Regarding claim 14,** LeCrone, Rai, and Henry fail to disclose a concatenation position judgment unit which judges a concatenation position of the first storage subsystem based on information stored in said status information acquisition command received from said upstream storage subsystem,

Wherein when said concatenation position judgment unit judges that the first storage subsystem is a storage connected to said host computer, then, said interface sends the status information stored in said status information storage unit to said host computer.

Reichbauer discloses a concatenation position judgment unit which judges a concatenation position of the first storage subsystem based on information stored in said status information acquisition command received from said upstream storage subsystem,

Wherein when said concatenation position judgment unit judges that the first storage subsystem is a storage connected to said host computer, then, said interface sends the status information stored in said status information storage unit to said host computer.

In column 1, lines 36-45 and column 9, lines 31-51 in Reichbauer a method for acquiring and distributing an address table containing address information of all of the nodes. The sequence of the addresses specifies the sequence or the position of the station in the network. The table can then be distributed with the status request in the network of LeCrone. The table can then be used to determine what position a storage system is in the network.

The storage system would be able to tell if it were directly connected to the host. Providing the address table would establish another method for the storage system to determine if it is connected to the host. If the storage system is directly connected to the host computer it has no choice when sending status information except to send it to the host.

LeCrone, Rai, Henry, and Reichbauer are analogous art because they are from the same field of endeavor, communication networks.

At the time of invention it would have been obvious to a person of ordinary skill in the art to take the address table collection and distribution method and use it in the network of LeCrone, Rai, and Henry.

The motivation for doing so would have been to provide tabular information in an economical manner **(Column 1, Lines 36-45).**

Therefore, it would have been obvious to combine the address table collection and distribution method of Reichbauer with the network of LeCrone, Rai, and Henry for the benefit of providing tabular information in an economical manner to obtain the invention as specified in claims 14, 15, 16, and 21.

10. **Regarding claim 15**, LeCrone, Rai, and Henry in view of Reichbauer disclose a first storage subsystem according to Claim 14, wherein when said target storage subsystem judgment unit judges that said target storage subsystem is all of said plurality of storage subsystems including the storage subsystem sequentially concatenated from said host computer, and said concatenation position judgment unit judges that the first storage subsystem is not a storage subsystem concatenated at a farthest position relative to said host computer among said plurality of storage subsystems sequentially concatenated, then, said command downstream sending unit sends said status information acquisition command to the third storage subsystem connected to the storage subsystem,

Wherein said self status information acquisition unit adds the acquired status information of the first storage subsystem to the status information that is received by said downstream status information acquisition unit from said third storage subsystem and stored in said outgoing status information storage unit, and then, said self status information acquisition unit stores resultant status information to be sent to the second storage into said outgoing status information storage unit, and wherein after said self status information acquisition unit stores said status information into said outgoing status information storage unit, said interface sends said status information.

LeCrone shows that there is an 'ALL' command associated with the query request. (See Column 9, Lines 9-12 of LeCrone) The request specifies a path and ends in all, which signifies requesting the status information of all

systems at that path. LeCrone also teaches that the path portion of the query command is optional. (Column 9, Lines 5-8) If the host were to issue a query command with no path and 'ALL' then it requests the status information of all of the storage systems. If a system gets the request it will not only acquire its own status information, but it will also send the request downstream to the units farther down the line. When the unit receives the status information from the downstream unit it would also include its status information having been requested by the 'ALL' request.

11. **Regarding claim 16**, LeCrone, Rai, and Henry in view of Reichbauer disclose a storage subsystem according to Claim 15, wherein when said target storage subsystem judgment unit judges that said target storage subsystem is all of said plurality of storage subsystems including the storage subsystem sequentially concatenated from said host computer, and said concatenation position judgment unit judges that the first storage subsystem is not the storage subsystem concatenated at a farthest position seen from said host computer among said plurality of storage subsystems sequentially concatenated, then, said command downstream sending unit instructs said self status information acquisition unit to acquire the status information of the first storage subsystem and to store the acquired status information to be sent to the second storage into said outgoing status information storage unit.

Claim 16 is rejected using the same rationale as claims 14 and 15. If the 'ALL' command is utilized then each storage system will acquire its status information and prepare to send it upstream.

12. **Claim 21 is rejected using the same rationale as Claim 15 and Claim 13.**

13. Claims 17, 18, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over LeCrone (U.S. Patent No. 6,529,944), Rai et al. ((US Patent No. 6,438,110) herein after Rai), Henry et al. ((US Patent No. 6,681,392) herein after Henry), and Reichbauer et al. (herein Reichbauer (U.S. Patent No. 4,881,074)) as applied to claim 16 and further in view of Inamine (U.S. Patent No. 6, 196, 735).

14. **Regarding claim 17**, LeCrone, Rai, Henry, and Reichbauer fail to disclose a storage subsystem according to Claim 16, further comprising:

An acquired information judgment unit, which judges whether status information whose acquisition is requested by the status information acquisition command received, is newest status information,

Wherein when said acquired information judgment unit judges that the newest status information is not requested, said concatenation position judgment unit judges that the first storage subsystem is a storage subsystem, and said outgoing status information storage unit holds the status information, then, said interface sends the held status information to the host computer without waiting for said self status information acquisition unit or said downstream status information acquisition unit to store status information into said outgoing status information storage unit.

Inamine discloses a storage subsystem according to Claim 16, further comprising:

An acquired information judgment unit, which judges whether status information whose acquisition is requested by the status information acquisition command received, is newest status information,

Wherein when said acquired information judgment unit judges that the newest status information is not requested, said concatenation position judgment unit judges that the first storage subsystem is a storage subsystem, and said outgoing status information storage unit holds the status information, then, said interface sends the held status information to the host computer without waiting for said self status information acquisition unit or said downstream status information acquisition unit to store status information into said outgoing status information storage unit.

Inamine (Column 5, Line 64 – Column 6, Line 12) discloses a method where the host is able to make a request to refresh status information or not to refresh status information. When the status request is not a request for refresh status information the stored status information is sent. When the request is a request for refresh status information the system refreshes the status information with the newest status information and sends the newest status information to the host.

LeCrone, Rai, Henry, Reichbauer, and Inamine are analogous art because they are all from the same field of endeavor, network computing.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to implement the refresh status information request of Inamine in the network system of LeCrone, Rai, Henry, and Reichbauer.

The motivation for doing so would have been to avoid low utilization of data. (**Inamine: Column 1, Lines 61-64)**

Therefore it would have been obvious to combine the refresh status information request of Inamine in the network system of LeCrone, Rai, Henry, and Reichbauer for the benefit of avoiding low utilization of data to obtain the invention as specified in claim 17.

15. **Regarding claim 18**, LeCrone, Rai, Henry, Reichbauer, and Inamine disclose in a computer system which includes a plurality of storage subsystems that performs a remote copy between two or more of said plurality of storage subsystems, a first storage subsystem comprising:

An interface which receives a status information acquisition command and which sends status information from and to a second storage subsystem that is located on a nearer side of the storage subsystem relative to a host computer and is connected to the first storage subsystem and at least one third storage subsystem located on a farther side of the storage subsystem relative to the host computer, said data transfer rate is being used to determine, by said host computer, which of at least one of plurality of status information acquisition command routes is displayed on said host computer, said status information acquisition command routes being routes on which a status information acquisition command is relayed via one or more of said plurality of storage subsystems,

An outgoing status information storage unit which stores said status information to be sent to said second storage subsystem,

A concatenation position judgment unit which judges a concatenation position of the first storage subsystem based on information stored in said status information acquisition command received from said second storage subsystem, and

A status information acquisition unit,

Wherein said status information acquisition unit acquires the status information of the first storage subsystem at status information acquisition time intervals stored in the status information acquisition command, to store the acquired status information into the outgoing status information storage unit, when said concatenation position judgment unit judges that the first storage subsystem is a storage subsystem located at a farthest position in concatenation order relative to the host computer, and

Wherein said status information acquisition unit acquires the status information of the storage subsystem at a time of receiving status information from a third storage subsystem connected to and located on a farther side of the storage subsystem relative to the host computer, and adds the status information of the first storage subsystem to the received status information of said third storage subsystem, to store resultant status information to the status information storage unit, and

Wherein when the concatenation position judgment unit judges that the storage subsystem in question is not a storage subsystem connected directly to the host computer, then, said interface sends all of said status information stored in the status information storage unit to said upstream storage subsystem.

Claim 18 is rejected using the same rationale as claims 13, 15 and 17 in addition to Inamine: Column 1, lines 58-60. Inamine teaches the acquisition of status information at predetermined regular time intervals. When the acquisition occurs it will occur in the farthest storage subsystem at regular intervals.

16. **Regarding claim 22**, LeCrone, Rai, Henry, Reichbauer, and Inamine disclose in a computer system which includes a plurality of storage subsystems performing a copy between at least one of said plurality of storage subsystems, a status information monitoring method for monitoring remote copy status of at least one of the storage subsystems sequentially concatenated to first storage subsystem directly coupled to a host computer, said status information monitoring method comprising the steps of:

Generating a status acquisition command for acquiring, at regular time intervals, remote copy status information of the storage subsystems constituting a specific sequence connected to the host computer said status information including a data transfer rate of copying data between a plurality of logical volumes of at least one of the storage subsystems, said data transfer rate is being used to determine, by said host computer, which of at least one of plurality of status information acquisition command routes is displayed on said host computer, said status information acquisition command routes being routes on which a status information acquisition command is relayed via one or more of said plurality of storage subsystems,

Sending the generated status acquisition command to the first storage subsystem,

Receiving the sent status acquisition command in the first storage subsystem,

When the received status acquisition command is a command for acquiring the status information of the sequence to which the first storage subsystem belongs, sending the status acquisition command to a second storage subsystem connected to the first storage subsystem,

Sending the received command at said second storage subsystem to a third storage subsystem connected at an end farthest from the host computer,

Acquiring said status information to be sent to the second storage subsystem connected to the third storage system,

According to the received status acquisition command, in the third storage system connected at the end;

Judging in the third storage subsystem, whether or not the storage subsystem is the first storage subsystem,

When it is judged that the storage subsystem is not the first storage subsystem, sending the status information of the third storage subsystem from the third storage subsystem to the second storage subsystem,

Receiving, in the second storage subsystem, the status information of the third storage subsystem,

Adding, in the second storage subsystem, the status information of the second storage subsystem to the received status information of the third storage subsystem'

Judging, in the second storage subsystem, whether or not the storage subsystem is the first storage subsystem,

When it is judged that the storage subsystem is not the first storage subsystem, sending the received status information of the third storage subsystem and the second storage subsystem from the second storage subsystem to the first storage subsystem,

Receiving, in the first storage subsystem, the status information of the third storage subsystem and the second storage subsystem,

Adding, in the first storage subsystem, the status information of the first storage subsystem to the received status information of the third storage subsystem and the second storage subsystem,

Judging, in the first storage subsystem, whether or not the storage subsystem is the first storage subsystem,

When it is judged that the storage subsystem is the first storage subsystem, holding resultant status information,

Generating, in the host computer, a status information acquisition command for acquiring remote copy status information of all the storage subsystems constituting a specific sequence connected to the host computer,

Sending, in the host computer, the generated status information acquisition command to said first storage subsystem,

Receiving, in the first storage subsystem, the sent status information acquisition command

Sending from the first storage subsystem, the resultant status information held by the first storage subsystem to the host computer when a sequence designated

by said command as a sequence from which status information is to be acquired is a sequence to which the first storage subsystem belongs, and

Receiving the sent status information in the host computer.

Claim 22 is rejected using the same rationale as claim 18. The status acquisition at regular time intervals occurs all throughout the system.

17. Claims 19, 20, 23, 29, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over LeCrone (U.S. Patent No. 6,529,944), Rai et al. ((US Patent No. 6,438,110) herein after Rai), and further in view of Arimilli et al ((US Patent No. 6,393,528) herein after Arimilli)

18. **Regarding claim 19**, LeCrone discloses a computer system comprising:

A plurality of storage subsystems in which a remote copy is performed between two or more of said plurality of storage subsystems **(Figure 1, Element SYMM2, SYMM5, SYMM6)**,

Wherein a first storage subsystem comprising:

A cache memory which temporarily stores data sent from said host computer,

An interface which receives status information acquisition command and which sends status information to a second storage subsystem that is located on a nearer side of the first storage subsystem relative to the host computer and is connected to the first storage subsystem,

An outgoing status information storage unit which stores said status information to be sent to said second storage subsystem,

A target storage subsystem judgment unit which judges whether a target storage subsystem identified in the status information acquisition command received through said interface is the first storage subsystem,

A command downstream sending unit which sends said status information acquisition command to said third storage subsystem, when said target storage subsystem judgment unit judges that the first storage subsystem is not said target storage subsystem from which said status information is to be acquired,

A self status information acquisition unit which acquires the status information of the storage subsystem and which stores the acquired status information to be sent to the second storage subsystem into said ongoing status information storage unit, when said target storage subsystem judgment unit judges that the first storage subsystem is said target storage subsystem from which said status information is to be acquired, and

A downstream status information acquisition unit which receives the status information from said third storage subsystem and which stores the received status information to be sent to the second storage into said outgoing status information storage unit,

wherein after said self status information acquisition unit or said downstream status information acquisition unit stores said status information into said outgoing status information storage unit, said interface sends said status information stored in said outgoing status information storage unit,

Wherein said host computer comprises:

A status information acquisition command generation unit which generates said status information acquisition command,

A status information acquisition unit which receives status information from said plurality of storage subsystems, and

A remote copy adjustment unit which generates information for adjusting a remote copy according to said status information held in said status information holding unit.

This claim is rejected using the same rationale as Claim 13. Further including that the host unit would require a status information acquisition command generation unit in order to send status requests to the backup units. Also a status information acquisition unit which receives status information would be necessary for the host to receive the status information sent from the backup units.

In column 8, lines 34-47 LeCrone talks about the host having the ability to send a command downstream that can have a changing effect on one of the systems. If the target reports that it is idle in the status information that the host requests, the host can then send a command to the unit. Thereby using the status information to send an adjustment.

LeCrone fails to disclose wherein said status information including a cache usage rate, which indicates a usage rate of said cache memory of said first storage subsystem or at least one cache memory of at least one third storage subsystem that is located on

a farther side of first storage subsystem relative to the host computer and connected to first storage subsystem.

Arimilli discloses wherein said status information including a cache usage rate, which indicates a usage rate of said cache memory of said first storage subsystem or at least one cache memory of at least one third storage subsystem that is located on a farther side of first storage subsystem relative to the host computer and connected to first storage subsystem. **(Arimilli: Column 4, Line 66- Column 5, Line 6)**

LeCrone and Arimilli are analogous art because they are from the same field on endeavor, computer memory systems.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to transfer the cache usage of Arimilli as part of the query request of LeCrone.

The motivation for doing so would have been to be able to respond to a prefetch limit to allocate another cache line to improve system performance and efficiency. **(Arimilli: Column 4, Line 63- Column 5, Line 6)**

Therefore at the time of the invention it would have been obvious to transfer the cache usage of Arimilli as part of the query request of LeCrone for the benefit of responding to a prefetch limit to allocate another cache line to improve system performance and efficiency to obtain the invention as specified in Claim 19.

LeCrone and Arimilli fail to disclose wherein the said cache usage rate is being used to determine, by said host computer, which of at least one of plurality of status information acquisition command routes is displayed on said host computer, said status

information acquisition command routes being routes on which a status information acquisition command is relayed via one or more of said plurality of storage subsystems,

Rai discloses wherein the said cache usage rate is being used to determine, by said host computer, which of at least one of plurality of status information acquisition command routes is displayed on said host computer, said status information acquisition command routes being routes on which a status information acquisition command is relayed via one or more of said plurality of storage subsystems, **(Rai: Figures 17 and 18. Column 16, Lines 14-17 along with Figure 13 and Column 15, Lines 18-30) Rai discloses the ability to schedule the connections based on varying factors. One of them being cache usage rate. When selecting cache usage rate as a scheduling factor it will then cause the connection to be displayed by the scheduler. Therefore the cache usage rate has been used to determine which routes are displayed.)**

LeCrone, Arimilli, and Rai are analogous art because they are from the same field of endeavor, network computer systems.

At the time of the invention it would have been obvious to one of ordinary skill in the art to display the network links' bitrate capacity and usage of Rai in the system of LeCrone and Arimilli.

The motivation for doing so would have been to provide the operator with useful information for managing the connections over various links in such a way as to average out the overall traffic loading on the network due to the scheduled connections,

avoiding any periods where particular links become overloaded, and balancing out the requested connection over a plurality of different links and spread out over time.

Therefore it would have been obvious to display the network links' bitrate capacity and usage of Rai in the system of LeCrone and Arimilli for the benefit of providing the operator with useful information for managing the connections over various links in such a way as to average out the overall traffic loading on the network due to the scheduled connections, avoiding any periods where particular links become overloaded, and balancing out the requested connection over a plurality of different links and spread out over time to obtain the invention as described in claim 19.

19. **Claims 20, 23, 29, and 30 are rejected using the same rationale as Claim 19.**

20. **Claim 24 is rejected using the same rationale as claim 18 in combination with the same rationale as claim 19.**

Response to Arguments

21. Applicant's arguments with respect to claims 13 and 18-31 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

22. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael B. McFadden whose telephone number is (571)272-8013. The examiner can normally be reached on Monday-Friday 8:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sam Sough can be reached on (571)272-6799. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MBM
11/09/2006

HYUNG SOUGH
SUPERVISORY PATENT EXAMINER
11/17/06